INTERVIEW SUMMARY

Applicants would like to thank Examiner Rines for the courtesies he extended them and their attorney in the personal interview conducted on September 20, 2007. In the interview the Applicants described an exemplary embodiment of the present invention and they and their attorney discussed the disitnguishing features of the claimed invention over the Summerell reference with Examiner Rines. Examiner Rines indicated that he understood the fundamental differences between the Summerell system and that of the claimed invention, and would consider further amendments clarifying these differences, subject to further searching.

REMARKS

Claims 1-20 are pending in this application. Claims 1-20 stand rejected.

Independent claim 1 and dependent claims 2 and 5 stand rejected under 35 U.S.C. §102(e) as being anticipated by Summerell et al., U.S. Patent No. 5,937,387 (hereinafter "Summerell"). Claims 6-14 and 17-20 stand rejected under 35 U.S.C. §103(a) as unpatentable over Summerell. Claims 3-4 and 15-16 stand rejected under 35 U.S.C. §102(a) as unpatentable over Summerell in view of Hele at al., U.S. Patent No. 5,937,387 (hereinafter "Hele"). Applicants respectfully traverse the foregoing claim rejections. Claims 1, 2, 6, 8 and 17 have been amended. Favorable reconsideration is requested.

As set forth in detail in the present application, Applicants' invention is directed to embodiments of a system and method for determining the importance of individual variables that contribute to the overall score associated with a multivariate statistical model for predicting the profitability of an insurance policy. The system and method of the claimed invention evaluate such a scoring model to determine the contribution of each individual predictable

variable to the overall score generated by the scoring function. The system and method of the present claimed invention also quantify the contribution of each predictive variable to the score generated by the model by populating a database associated with the system with a mean value and standard deviation value for each of the plurality of variables, calculating a partial derivative or slope of the scoring function with respect to each of the individual variables, calculating a deviance based on the slope and standard deviation for each of the plurality of variables and multiplying the deviance value and slope value for each of the plurality of variables to quantify the contribution of each of the plurality of variables to the score. The quantified contribution can then be used to rank the variables by importance to the overall score.

Summerell describes embodiments of a system and method for developing a customized wellness plan for measuring a user's wellness by determining a user's physiological age. The interactive wellness system and method of Summerell collects published information regarding risk factors. However, each risk factor (analogous to a variable in the claimed invention), in contrast to the claimed invention, is obtained form different published studies analyzing different data sets. There is no suggestion to obtain several risk factors – let alone all of them – from the same training data. Again in contrast to the claimed invention, there is no suggestion in Summerell to let a set of predictive variables emerge form the data, as for example, is the case with a multivariate statistical model. Further, Summerell uses the disparate risk factor data to create a single quantity, a combined risk factor, which is a product of all the individual risk factors, not a multivariate expression that preserves the contribution of each, and uses this product as an exponent for an upper and lower survival rate number, each obtained, again, from published U.S. Census data. The resulting numbers, being a survival rate taken to the same composite risk factor power, are used for an interpolation calculation to find a survival rate

between them corresponding to a "physiological age." This interpolation is where on a standard census table mortality curve the individual lies. Once the combined risk factor is calculated, there is no means to access any individual variable, let alone calculate its contribution, the deviance of a particular value for the variable, etc., as in the claimed invention.

As discussed in the interview, the Summerell system is complex, perhaps needlessly so. Applicants have analyzed it in detail, as follows. Summerell's patent proposes a four step approach to calculate the physiological age of a person with several "wellness/risks" factors. The approach and the steps are as follows:

Step 1: Collecting Published Research Data to Specify "Relative Risk Factors" for Various Wellness/Risk Factors

For example, if a published study indicates that over a one year period, there are 160 deaths out of 1,000 for smokers vs. 100 deaths out of 1,000 for non-smokers, then the relative risk factor for smoking is = 160/100 = 1.6.

Therefore, if the relative risk factor is greater than 1, then it is a bad factor, while it is a good factor if it is less than 1.0.

Summerell at 10:17-67 and Table One.

Step 2: Calculate the "Composite Risk Factor" across Different Wellness/Risk Factors with Adjustments for a Series of Considerations

When there are several risk/wellness factors in consideration, the "Composite Risk Factor" is the multiplicative result of the individual relative risk factor from Step 1.

However, before the multiplication, the individual relative risk factors will be adjusted for several other considerations, including possible covariance between the factors, the quality of the published relative risk factor, and correlation of the wellness/risk factor with the target information, etc.

Summerell at 11:13-30,;13:25-14:20; Fig. 11.

Step 3: Calculate the "Adjusted Survival Rate" based on the "Composite Risk Factor":

First, the survival rate curve for the "standard" population by age is set up using US Census data.

Then, Summerell defines two "reference ages" – the lower limit age and the upper limit age. The lower limit age is the person's age minus 15, while the upper limit age is the person's age plus 15. Then, the survival rates for the lower and upper ages for the standard population are obtained from the standard population. For example, if a person in interest is 50, then the upper limit age is 65 and the lower limit age is 35.

Summerell at 11:50-12:30 and Fig. 8.

The next step is to calculate the "adjusted survival rates" for the lower and upper limit ages using the formula of "standard survival rates" to the power of "composite risk factor". Since the survival rate is smaller than 1.0, so the adjusted survival rates will decrease if the composite risk factor is greater than 1.0, and will increase if the composite risk factor is less than 1.0. In the example above, we will calculate the "adjusted survival rates" for age 65 and age 35, using the standard survival rates of 65 and 35 to the power of the composite risk factor.

The final step is to calculate the "final adjusted survival rate" using a smoothing, interpolating technique between the lower and upper limit ages and their associated adjusted survival rates. That is, in order to calculate the "final adjusted survival rate", Summerell uses a smoothing, interpolating technique to interpolate the adjusted survival rates of age 35 and age 65 to obtain the adjusted survival rate for age 50.

The smoothing, interpolating technique is based on the "Beta0" and "Beta1" formulas given in the patent. This technique is "essentially" a "linear interpolation" technique with the logarithm transformation of the survival rate. The reason why logarithm transformation is used is because the survival curve is not a linear pattern, but is an exponential decreasing shape from the upper left to the lower right.

Id. at Fig. 10 and 13:10-24.

Step 4: Use an "Iterative" Algorithm to Calculate the Physiological Age with the Final Adjusted Survival Rate

After the final adjusted survival rate is obtained from Step 3, Summerell's patent proposes an "iterative" algorithm to find the "age" from the standard population with the same survival rate, and such "age" is the "physiological" age.

The iterative procedure is a known technique for "root finding". The first step is to guess an initial age and find the survival rate associated with the guessed age for the standard population. Then, calculate the difference between the final adjusted survival rate and the rate for the initial guessed age. Then, the "next guessed age" is equal to the initial guessed age plus the multiplication result of the "first derivative" and the difference between the two rates. This process will be repeated until the final "age" is found with the survival rate the same as the final adjusted survival rate from Step 3.

Id. at Fig. 13 and 16:16-35.

In all these calculations, the goal is merely to interpolate correctly on the survival rate curve of Fig. 10, which is a function of one single variable, age. No contribution of any individual variable is relevant to this process, and no slope of any individual variable is calculated.

II. An Example

The following illustrates an example as how Summerell's method would calculate a person's "physiological" age for an individual with 3 risk factors of smoking, blood pressure, and Vitamin C taking:

- 50 years old male
- Smoking half pack a day
- Blood pressure is 180 and 100
- Taking 400 mg Vitamin C a day

Step 1: Collecting Industry Research Data to Specify "Relative Risk Factors" for the Three Risk Factors (See Page 9-60 to Page 10-20)

- Smoking half pack a day – assuming that the relative Risk is "1.5", so it is a bad factor.
- Blood pressure of 180 and 100 – assuming that relative Risk is "1.2", so it is a bad factor
- Vitamin taking - assuming that relative risk is "0.8", so it is a good factor

Step 2: Calculate the Composite Risk Factor with Adjustment for a Series of Considerations (See Page 14-20 to Page 15-5, and Table 2)

- The formula to calculate the "composite risk factor" is to multiply the individual risk factors together.
- However, before the multiplication, individual risk factor can be adjusted up or down by the "correlation" among the factors, whether the impact of the factor is related or not related to the study, and the quality of the "published risk factors".
- Assuming that after the above consideration, we have the following final adjusted risk factors:
    - Smoking half pack a day – Adjusted Relative Risk is "1.4" because the published result of 1.5 is "overstated" the true risk.
    - Blood pressure of 180 and 100 – Relative Risk is "1.2"
    - Vitamin taking - Relative Risk is "0.9" because the published result of 0.8 overstate the "benefit".
- Then, the final "Composite Risk Factor" = 1.4 * 1.2 * 0.9 = 1.512, which indicates that combined effect of the three factors is "bad".

Step 3: Calculate the Survival Rate with the Composite Risk Factor

- First, define the "lower limit age" and "upper limit age" as follows:.
    - Lower limit age = 35 = 50-15

- Upper limit age = 65 = 50 + 15

- Second, find out the "survival rate" for age 35 and age 65 from the "standard population" (the numbers below are given in Fig. 10)
  - ASR_{sl} (lower limit survival rate for age 35 for standard population) = 0.971
  - ASR_{su} (upper limit age survival rate for age 65 for the standard population) = 0.683
- The next step is calculate the "survival rate" for the composite risk for the lower limit age and the upper limit age
  - $ASR_{ul} = ASR_{sl}^{(\text{composite risk factor})} = 0.971^{(1.512)} = 0.956$
  - $ASR_{uu} = ASR_{su}^{(\text{composite risk factor})} = 0.683^{(1.512)} = 0.562$

  The survival rate decreases because the composite risk factor of 1.512 is greater than 1.

- The next step is calculate two variables, Beta 1, and Beta 0 (see page 15-20):
  - Beta 1 = $\{\ln[(ASR_{ul})/(1- ASR_{ul})] - \ln [(ASR_{uu})/(1- ASR_{uu})]\} / (LAL-UAL) \} = -0.09471$
  - Beta 0 = $\ln [(ASR_{ul})/(1- ASR_{ul})] - (LAL * Beta\ 1) = 6.40773$
- The next step is to calculate the final adjusted survival rate for the 50 years old person with the profile of smoking, high blood pressure, and taking Vitamin C. The formula below is essentially a "linearly interpolated" result from the adjusted survival rates of upper limit and lower limit ages from the previous step.
  - ASRUC = exp (Beta 0 + Beta 1 * Chronological Age) / [1 + exp (Beta 0 + Beta 1 * Chronological Age) = exp (6.40773 – 0.09471 *50) / [1 + exp (6.40773 – 0.09471 *50)] = 0.841.

Step 4: Using an Iterative Procedure to Estimate the Physiological Age for the Calculated Survival Rate

- From the result given above, 0.841, it can be seen that compared to the standard population survival rate given in Table 10, it is falling into an age between 55 to 60. However, in order to get the "exact age" from the standard population that corresponds to the survival rate of 0.841, Summerell proposes the following iteration procedure:
  - Estimate an age, assume for example, 50, to begin with
  - Calculate the survival rate from the standard population table for age 50, compare to the final adjusted survival rate for the difference.
  - The next estimate age will be equal to the initial guessed age of 50 plus the multiplicative result of the first derivative of the survival function and the difference between the final adjusted survival rate and the survival rate based on the "guessed" age.
  - Keep repeating the procedure until it converges, that is, until there is no difference between the final adjusted survival rate and the survival rate based on the estimated age. Then, the final estimated age is the "physiological age."

- It is only in this iteration process for an overall "physiological age" that Summerell utilizes a slope, f'(x) of a function of a single variable f(x), the single variable x being age. The contribution of Summerell's various risk factor data is all combined in the composite risk factor, and Summerell teaches no process by which to isolate the contribution of one risk factor to the final composite risk factor.

Thus Summerell does not disclose, suggest or yield the claimed invention. Summerell does not disclose each element of the rejected claims, and accordingly, the Office Action has not made out a *prima facie* case of anticipation.

Summerell nowhere teaches or suggests developing a multivariate statistical model and generating a scoring formula therefrom from a set of data acquired for the same persons. Nor does Summerell means for calculating the contribution of any of the plurality of variables based on the calculated slope and deviance values according to the present invention as affirmatively recited in independent claim 1 of the present application. *Cf.* Specification at [0026]-[0038] (Importance = Slope * Deviance).

Summerell is concerned with calculating a "physiological age" for a user based on a survival curve in order to create a customized wellness plan. *See* Summerell at 15:6-16:35. Predetermined relative risk factors (not variables generated form a multivariate statistical model) are used to modify the survival rate and mortality rate of the standard population in order to assess the physiological age of a user. The individual contribution of each of these relative risk factors is not calculated as part of the assessment of the physiological age. As a result, Summerell is not concerned with the importance of each contributing variable but is instead focused on the final end result of a function of one variable – physiological age as a function of calculated survival rate, which is the x-intercept of an interpolated survival rate value, or the inverse of the Survival Rate = f(age) plot of Fig. 10.

The difference between Summerell and the present claimed invention is clearly illustrated by comparing Table Two of Summerell (which the Examiner heavily relies upon to support the arguments presented in the Office Action) with Fig. 5 of the present application specification. The relative risk, first relative risk adjustment and second relative risk assessment (columns 2, 4 and 6, respectively) in Table Two of Summerell are not even remotely comparable to the Importance (column 5) and Rank (column 6) of Fig. 5. As such, Summerell does not teach or suggest means for calculating the contribution of any of the plurality of variables based on the calculated slope and deviance values according to the present invention. Accordingly, claim 1 of the present application recites features nowhere found in the Summerell reference, and, thus, Summerell cannot anticipate claim 1.

Claim 1 is thus respectfully submitted as patentable over Summerell. It is further submitted that dependent claims 2 and 5 are also allowable by reason of their various dependencies from independent claim 1, as well as for the additional features and structure recited therein. Notice to this effect is also earnestly requested.

Independent claims 8, 13 and 17 and dependent claims 6-7, 9-12, 14 and 18-20, stand rejected under 35 U.S.C. §103(a) as being obvious over Summerell. Applicants respectfully traverse the foregoing claim rejections.

As discussed above, Summerell describes embodiments of a system and method for developing a customized wellness plan for measuring a user's wellness by determining a user's physiological age. However, Summerell nowhere teaches or suggests multiplying the deviance value and slope value for each of the plurality of predictive variables to determine the contribution of each of the plurality of predictive variables to the score according to the present invention. Summerell is concerned with calculating physiological age for a user based on a user

survival curve in order to create a customized wellness plan. Relative risk factors are used to assess the physiological age of a user. The individual contribution of these relative risk factors is not calculated as part of the assessment of the physiological age. *See* Summerell at 15:6-16:35. *Cf.* Specification at [0026]-[0038] (Importance = Slope * Deviance).

Because Summerell fails to teach or suggest multiplying the deviance value and slope value for each of the plurality of predictive variables to determine the contribution of each to a score as claimed in the independent claims 8, 13 and 17, it is submitted that one of ordinary skill in the art at the time of the invention who reads and understands Summerell would not be motivated, let alone equipped, to arrive at the present claimed invention.

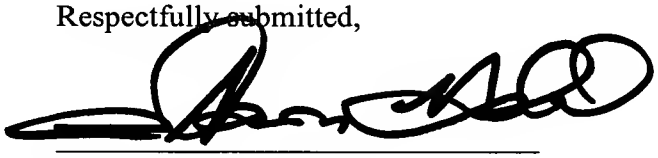
Hele is not seen to cure the defects of Summerell as a reference against the independent claims. Thus, dependent claims 3-4 and 15-16 are also allowable by reason of their various dependencies from independent claims 1 and 13, as well as for the additional features and structure recited therein. Notice to this effect is earnestly requested.

On the basis of the foregoing remarks, Applicants respectfully submit that this application is in condition for immediate allowance, and notice to this effect is earnestly requested. The Examiner is invited to contact Applicants' undersigned attorneys at the telephone number set forth below if it will advance the prosecution of this case.

A directive to charge the undersigned attorneys' deposit account in the amount of $1,050.00 covering the fee for the Petition for a Three-month Extension of Time submitted herewith was made in that paper, and a similar directive for the $810.00 RCE fee was made in

the RCE Transmittal submitted herewith. No other fees are believed due, but please charge any fee deficiency, and credit any overpayment, to Deposit Account No. 50-0540.

Respectfully submitted,



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